DOCUMENT RESUME

ED 158 409 EA 010 836

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TITLE Class Size or Mode of Instruction: What Makes the Difference in Classroom Process?
PUB DATE Jun 78
NOTE 14p.; Paper presented at the Canadian School Trustees' Association Congress on Education (1st, Toronto, Ontario, June 17-21, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Academic Achievement; Class Activities; *Class Size; Elementary Secondary Education; Tables (Data); Teaching Methods
IDENTIFIERS *Indicators of Quality

ABSTRACT

Research into the question of class size has produced varied findings regardless of the nature of the dependent variable(s) used in the study (achievement, attitude, teacher behavior, or whatever). Thus, it is possible to either support or oppose smaller class sizes to achieve some educational end and to cite research to support one's position. This situation has led to teachers' organizations, school divisions, legislators, and researchers scurrying about to locate research findings to support their espoused positions, often with political, rather than educational, goals in mind. One frequently quoted piece of research on class size and the educational process was conducted during the development of the classroom observation instrument, Indicators of Quality. This research supports smaller class size as a means to the goal of improved "classroom process." However, using an alternate analysis technique on the same data, it can be shown that mode of classroom instruction is the principal variable that affects the classroom process score. This paper investigates the shift in findings generated by the alternative analysis technique. (Author)

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ED158409

EA 010 836

Class Size or Mode of Instruction: What Makes the Difference in Classroom Process

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The question of what is the right or best class size for a teacher to handle has been the subject of many investigations over the years.

Frequently, when this question is asked by non-educators, and sometimes unfortunately, by those who would characterize themselves as educators, there exists the serious difficulty of giving a simple answer to a complex question.

First of all, the questions that may be asked is what is the difference between a small class and a large class. One researcher[1] discovered that when he made a comparison of previous research done on class size, some of his predecessors defined a large class as one being composed of more than twenty-five students, while others defined a small class as being less than thirty students. So that what was a "large class" to some was a "small class" to others. One man's Mede was another man's Persian.

Secondly, the question has to be raised "Are small classes better than larger classes toward what end?" Clearly, a different number of students is optimal in a class of elementary school "special education" students than would be optimal in a lecture class in honors high school physics.

Third, the question can be raised as to what criterion we wish to apply to evaluating the impact of varying class size. Do we want increased school achievement as measured by some test, standardized or otherwise; improved student self-concept; improved human relations in the classroom, or what?

Mostly, the answers to these questions provided by advocates of one class size or another is "or what." They simply have not thought through the problem to the point of answering the question raised here. They rather employ the common sense notion, embraced by at least one political subdivision of the United States, that smaller classes are somehow better.

To digress for a moment, let me point out that one thing is clear: smaller classes are more expensive to maintain than larger ones. That this fact is not clear to everyone is made clear by a recent study commissioned by the very city of Toronto in which we are meeting. This study found that 29 percent of all parents surveyed did not know that smaller classes were more costly.[2]

But, back to the point. A study of financial practices in one state hit upon the issue of class size research more or less "*en passant.*" While the study group did not set out to examine the issue of class size, they realized its importance from a school finance perspective, and examined a multitude of studies that had been done on the class size issue. While their findings are documented in their report,[3] let me assure you that they are far from consistent, some showing small class size as "better," others showing class size makes no difference, and others indicating larger class sizes being "better" for certain areas.

In any event, the acrimony in the class size discussion has been exacerbated by two concommitant events. One is the financial recession that has been experienced in many localities in recent years; the other is the decreasing number of students that are enrolled in the public schools. Advocates of both large class size and small class size positions have been able to entrench behind new rationales for their positions.

On the one hand, advocates of larger class sizes see the decrease in students as an opportunity to reduce educational costs by reducing the number of teachers employed. On the other hand, advocates of smaller class size, frequently teachers' associations, see the reduction in the number of students to be served as an opportunity to improve the quality of instruction (thereby student achievement, improved self-concept, or what) by decreasing the number of students assigned to each teacher.

Keep in mind that there are no naturally identifiable "good guys" or "bad guys" in this controversy. There are simply differing groups trying to impose their views on other groups. And each group is armed with ample research to support its contentions. The issue therefore resolves into a political one: The group most able to convince the majority of concerned constituency that it is correct in what it says is likely to be most successful in achieving its aims.

As an illustration of this point, I would like to present the following data set (See Table I). This is probably the most widely disseminated of all tables extant on class size. The data in the table divided into Elementary and Secondary criterion scores refer to scores obtained on a classroom observation instrument, The Indicators of Quality.[4] This observation technique has been described as ... "the most extensive observation technique both in development and standardization".[5] It has been used in collecting classroom observation data on more than twenty thousand classrooms at the time of this writing. One thing to keep in mind is that Indicators of Quality never made any pretense of measuring students' school achievement. It was designed as a measure of the quality of the educational process. Olson[6] never made such a claim; however,

TABLE I

ELEMENTARY AND SECONDARY SCHOOL
IOQ MEAN SCORES BY SIZE OF CLASS

Number of Students	Elementary		Secondary	
	N	Mean	N	Mean
Under - 5	155	10.61	77	8.31
5-10	218	8.34	505	8.45
11-15	310	8.34	1248	6.25
16-20	1395	7.26	2032	4.77
21-25	3736	6.45	2427	4.25
26-30	2898	4.73	1361	3.93
31-35	931	4.66	361	3.51
36-40	129	3.17	136	4.41
41-50	64	4.38	121	3.65
Over-50	94	2.22	260	3.22
Total	9961		8567	
Means		5.96		4.83

several groups, including the New York State Federation of Teachers and the Alaska unit of the National Education of Teachers interpreted and Indicators scores as achievement measures (See Tables II and III). Comparisons of Tables I, II, and III make it clear that the data they contain all came from the same source.

Now, politically, these tables are galvinizing. After all, armed with these data alone, who could fail to agree that a class size of twenty-five at the elementary level, and a class size of fifteen at the secondary level would be outcomes devoutly to be wished.

However, further examination of these tables may prove enlightening. First of all, it is important to keep in mind that the numbers in these tables represent measures of the quality of the classroom process and have nothing to do with student achievement. However, first impressions, after looking at these tables lead to the conclusion that the numbers deal with the achievement of students in the classrooms observed.

For example, if we examine the data presented the New York Teacher, we notice that someone, either naively or insidiously, has added the note that "A higher numerical score indicates higher pupil achievement." Similarly, the article in the Alaska Teacher was entitled "Increase Learning by 53 Percent." (Emphases added in both cases.) At the risk of belaboring the issue, let me once again point out that both of these claims are untrue and cannot be supported with the data presented, since the Indicators of Quality yields scores that are reflective of classroom process and are not measures of any educational output, such as achievement or learning.

TABLE II

SUMMARY OF OLSON STUDY RESULTS*

	Elementary	Secondary
Under 5	10.61	8.31
5-10	8.34	8.45
11-15	8.34	6.25
16-20	7.26	4.77
21-25	6.45	4.25
26-30	4.73	3.93
31-35	4.66	3.51
36-40	3.17	4.41
41-50	4.38	3.65
50 Plus	2.22	3.22
Mean	5.96	4.83

Note: A higher numerical score indicates higher pupil achievement.

*The New York State United Teachers, The New York Teacher, Vol. XVII, No. 19, January 11, 1976.

TABLE III

ELEMENTARY AND SECONDARY OBSERVATIONS*
Scored by Size of Class

Class Size	Elementary		Secondary	
	N	Mean Score	N	Mean Score
Under 5	155	10.61	77	8.31
5-10	218	8.34	505	8.45
11-15	310	8.34	1248	6.25
16-20	1395	7.26	2032	4.77
21-25	3736	6.45	2427	4.25
26-30	2898	4.73	1361	3.93
31-35	931	4.66	361	3.51
36-40	129	3.17	136	4.41
41-50	64	4.38	121	3.65
50 plus	94	2.22	260	3.22
Total	9961		8567	
Means		5.96		4.83

N - Number of Classrooms researched

*The Alaska Teacher, NEA-Alaska, Volume XXI, Number 3, Spring 1974.

Without making any judgment as to whether the use of these data to give such an impression was the result of misunderstanding or malice, let me turn to a different point. The data reported in the original Olson study came about as part of an *ex post facto* analysis of an enormous amount of classroom observation information. Included in this larger data pool was information not only on criterion scores and class size, but also on such variables as "Subject Taught" and "Style of Activity" in the classroom. The existence of these additional variables suggested that further *ex post facto* analysis of the Indicators data might shed more light on the class size issue.

A clue to the direction that this analysis might take was provided by Olson[7]. In 1973, some three years after his original class size research was reported, Olson conducted a study in which he employed "a modified step-wise regression process" to determine the variables that best predict Indicators criterion scores. He found that "Style of Activity" in the classroom and "Subject Taught" both preceded "Class Size" as predictors of criterion scores. He noted that "... class size took a back seat to subject taught and style of activity as predictors of criterion scores." This research, perhaps understandably, has received far less attention from teachers' organizations than has his former work.

Given the clue provided by this research, it was decided that the same data set upon which Olson's original class size findings had been based, might be re-analyzed by examining the effect on criterion scores of both "Class Size" and "Style of Activity". Table IV & V were constructed using "Style of Activity" as row labels and "Class Size" intervals as column headings.

TABLE IV

INDICATORS OF QUALITY
Scores By Class Size and Activity

Activity	Elementary Sample								
	1-5	5-10	11-15	16-20	21-25	26-30	31-35	36-40	41-50
Ques. and Ans.	12.63	8.65	5.18	4.96	4.96	4.90	4.99	3.65	5.54
Discussion	10.33	9.69	7.60	7.85	7.56	7.44	8.12	4.47	8.85
Lecture	6.00	2.67	2.20	3.06	1.18	1.57	1.64	-0.14	-2.60
Small Group Work	10.47	12.75	13.38	10.90	11.87	12.14	12.30	12.60	10.81
Library Work	4.00	10.67	5.25	8.85	7.18	7.52	6.82	1.33	9.00
Individual Work	10.80	9.70	9.68	8.50	7.87	7.29	7.79	11.57	13.00
Demonstration	8.00	9.00	12.42	5.62	7.24	6.93	5.13	2.50	2.60
Laboratory	10.42	11.89	7.66	8.20	8.22	8.09	5.92	5.75	-10.00
Test	6.00	2.88	5.11	1.28	2.69	1.30	2.30	-2.50	17.00
Movie	--	--	-0.66	7.88	2.88	3.80	5.00	6.00	1.75
T.V.	--	--	5.66	4.80	3.67	3.27	1.07	9.00	1.00
Other	12.07	9.80	7.81	5.62	4.69	3.35	3.71	5.15	1.73
Seat Work	6.83	5.83	6.27	4.99	11.63	3.62	4.15	3.42	-0.50
Rehersal	10.43	7.47	6.33	3.82	2.84	4.54	3.40	6.33	2.85
Pupil Report	--	11.80	11.14	10.46	7.63	7.00	8.08	1.50	3.00
	N=181	266	397	1,276	3,858	3,906	1,302	167	85
	N=11,438		$\bar{X}$=5.96				=8.18		

TABLE V

INDICATORS OF QUALITY
Scores by Class Size and Activity

Activity	Elementary Sample								
	1-5	5-10	11-15	16-20	21-25	26-30	31-35	36-40	41-50
Ques. and Ans.	10.6	6.11	5.06	3.50	3.68	3.53	4.80	-0.29	8.00
Discussion	10.0	10.1	8.39	7.61	6.90	6.84	6.50	11.33	8.75
Lecture	4.33	3.20	0.88	0.63	0.35	1.05	0.30	1.00	0.20
Small Group Work	10.2	13.0	11.9	10.9	11.24	8.29	11.43	10.0	8.50
Library Work	--	8.50	5.33	7.45	6.25	5.80	4.00	0.0	--
Individual Work	8.70	10.3	8.89	8.51	6.70	6.32	6.15	5.78	6.22
Demonstration	7.50	6.44	6.13	5.77	5.82	5.51	2.30	--	5.80
Laboratory	12.4	9.07	8.37	8.10	7.51	6.86	8.45	4.80	8.00
Test	8.20	2.19	2.08	1.89	0.18	0.51	1.70	-0.50	0.16
Movie	--	5.78	0.39	0.71	1.12	0.28	1.14	-1.4	-2.67
T.V.	1.00	22.0	-1.50	6.16	6.50	--	9.00	--	--
Other	8.00	5.18	2.12	3.72	3.40	3.58	3.69	5.50	3.28
Seat Work	3.62	3.68	3.70	2.23	1.70	0.40	-0.69	2.37	-2.67
Rehersal	7.00	9.78	6.63	4.41	4.88	4.50	6.88	4.00	3.45
Pupil Report	--	9.33	7.60	7.30	5.52	5.80	6.40	3.00	2.50
	N=82	549	1,231	1,727	2,057	1,111	332	96	105
	N=7,290		$\bar{X}$=4.81				=7.46		

Examination of these tables makes one point clear: Class size by itself is not the single variable that controls criterion scores. Note that certain types of classroom activities outscore others regardless of class size. For example, "Small Group Work" outscores "Lecture" not only by a consistently large margin in every class size category, but also when "Small Group Work" classes of 31-35 are compared to "Lecture" classes of 16-20.

Consider further that the scores for certain types of classroom activities tend to be higher than the mean for the entire sample (in both elementary and secondary samples) without regard to the size of the classes under consideration. "Individual Work" in secondary classes of 36-40 students outscores "Lecture" in classes of five or fewer students. "Laboratory" consistently outscores "Demonstration" across all of the secondary class size categories. In the elementary classrooms that were observed, this same type of phenomenon appears, as one type of activity consistently outscores another. Note that in the elementary category, and "Pupil Report" likewise outscores "Movie" in every instance but one.

It would seem that those types of activities which allow students an active role in the pedagogical process are the ones that produce high Indicators score and may do so quite independently of the number of students in the classroom. However, whether or not this conclusion is valid, it must be pointed out that both Tables IV and V dictate conclusions opposed to, or at least different from, those conclusions drawn by advocates of small class size, despite the fact that all of the Tables here presented are based on essentially the same data.

All of the foregoing discussion is not meant to suggest that class size is of no importance in the educational enterprise. Rather, it is meant to raise a caution to those who, whether through naivete or motive, would cite this class size research with the aim of achieving some political end.

REFERENCES

Blake, Howard E. "Class Size: A Summary of Selected Studies in Elementary Public Schools," Unpublished doctor's dissertation, Teachers College, Columbia University, 1954.

Wright, E. N. et al. *Effects of Class Size in the Junior Grades*. Toronto: Minister of Education, Ontario, 1977.

Variables Related to Student Performance and Resource Allocation at the School District Level: A Survey of Research With Emphasis on the Policy Implications of the Findings. The University of the State of New York, The State Department of Education, Bureau of Evaluation, Albany, New York.

Olson, Martin N. "Identifying Predictors of Institutional Quality: An Examination of Eleven Internal Classroom Variables in Relation to a School System Criterion Measure." Unpublished doctoral dissertation, Teachers College, Columbia University, 1970.

White, S. H. et al. *Federal Programs for Young Children: Review and Recommendations. Volume I.* Publication No. (OS)74-101, U. S. Government Printing Office, Washington, D.C., 1974.

Olson, op. cit.

Olson, Martin N. "Classroom Variables That Predict School System Quality," IAR Research Bulletin, Vol. 11, No. 1 (October, 1973).